

CLAIMS

1. In a wireless communications system wherein an equalizer is used to
2 reduce interference on a communications channel, and wherein a Doppler
frequency is reflective of a rate of change of the communications channel, a
4 method for adjusting a length of the equalizer comprising increasing the length
as the Doppler frequency decreases, and decreasing the length as the Doppler
6 frequency increases.
2. The method of claim 1, wherein the equalizer comprises a main tap, a
2 first number of causal taps, and a second number of anti-causal taps, and
wherein said increasing comprises determining whether said causal taps are
4 more useful than said anti-causal taps, and if so, increasing said first number,
and if not, increasing said second number.
3. The method of claim 2, wherein said decreasing comprises determining
2 whether said causal taps are more useful than said anti-causal taps, and if so,
decreasing said second number, and if not, decreasing said first number.
4. The method of claim 1, wherein said increasing comprises determining
2 whether an elapsed time since the equalizer was last adjusted is greater than a
threshold, and if so, increasing the length as the Doppler frequency decreases.
5. The method of claim 1, wherein said increasing comprises determining
2 whether an elapsed time since the length was last decreased is greater than a
threshold, and if so, increasing the length as the Doppler frequency decreases.

6. The method of claim 1, wherein said decreasing comprises determining
 2 whether an elapsed time since the equalizer was last adjusted is greater than a
 threshold, and if so, decreasing the length as the Doppler frequency increases.

7. The method of claim 1, wherein said decreasing comprises determining
 2 whether an elapsed time since the length was last increased is greater than a
 threshold, and if so, decreasing the length as the Doppler frequency increases.

8. A method comprising:
 2 receiving transmitted symbols over a wireless communications channel;
 receiving a first Doppler frequency, wherein said first Doppler frequency
 4 is reflective of a rate of change of said wireless communications channel at a
 first time; and
 6 selecting a length of an equalizer based on said first Doppler frequency.

9. The method of claim 8, further comprising filtering said transmitted
 2 symbols using said equalizer.

10. The method of claim 8, further comprising:
 2 receiving a second Doppler frequency that is reflective of a rate of
 change of said wireless communications channel at a second time;
 4 determining a difference between said first Doppler frequency and said
 second Doppler frequency; and
 6 adjusting said length responsive to determining said difference.

11. The method of claim 10, wherein said adjusting comprises:
 2 determining an elapsed time since a prior adjustment to said length; and

determining whether said elapsed time satisfies an elapsed time
 4 threshold, and if so, adjusting said length based on said difference.

12. The method of claim 10, wherein said adjusting comprises determining
 2 whether said difference is reflective of an increase that satisfies a first threshold,
 and if so, decreasing said length.

13. The method of claim 12, wherein said equalizer comprises a main tap, a
 2 first number of causal taps, and a second number of anti-causal taps, and
 wherein said decreasing said length comprises determining whether said causal
 4 taps are more useful than said anti-causal taps, and if so, decreasing said
 second number, and if not, decreasing said first number.

14. The method of claim 13, wherein said determining whether said causal
 2 taps are more useful than said anti-causal taps comprises:
 calculating a first average of the magnitudes of said causal taps;
 4 calculating a second average of the magnitudes of said anti-causal taps;
 and
 6 determining whether said first average is greater than said second
 average, and if so, determining that said causal taps are more useful, and if not,
 8 determining that said anti-causal taps are more useful.

15. The method of claim 13, wherein said determining whether said causal
 2 taps are more useful than said anti-causal taps comprises:
 calculating a first magnitude of the causal tap furthest from said main tap;
 4 calculating a second magnitude of the anti-causal tap furthest from said
 main tap; and

- 6 determining whether said first magnitude is greater than said second
 magnitude, and if so, determining that said causal taps are more useful, and if
 8 not, determining that said anti-causal taps are more useful.

16. The method of claim 13, wherein said increasing said length comprises
 2 determining whether said causal taps are more useful than said anti-causal
 taps, and if so, increasing said first number, and if not, increasing said second
 4 number.

17. The method of claim 12, wherein said equalizer comprises a main tap, a
 2 first number of causal taps, and a second number of anti-causal taps, and
 wherein said decreasing said length comprises decreasing said first and second
 4 number equally.

18. The method of claim 17, wherein said increasing said length comprises
 2 determining whether said first number is less than said second number, and if
 so, increasing said first number, and if not, increasing said second number, and
 4 if said first number is equal to said second number, increasing said first number
 and said second number equally.

19. The method of claim 10, wherein said adjusting comprises determining
 2 whether said difference is reflective of a decrease that satisfies a second
 threshold, and if so, increasing said length.

20. The method of claim 8, wherein said selecting comprises:
 2 quantizing said first Doppler frequency into a first frequency bin having a
 first bin center; and
 4 determining said length using said first bin center.

21. The method of claim 20, wherein said determining said length comprises
2 consulting a look-up table, wherein said look-up table associates said length
with said first bin center.

22. The method of claim 8, further comprising:
2 quantizing said first Doppler frequency into a first frequency bin having a
first bin center;
4 receiving a second Doppler frequency that is reflective of a rate of
change of said wireless communications channel at a second time subsequent
6 to said first time;
determining a first difference between said first bin center and said
8 second Doppler frequency; and
adjusting said length based on said difference.

23. The method of claim 22, further comprising setting a bin center memory
2 to said first bin center, and wherein said adjusting comprises:
determining whether said first difference is reflective of an increase that
4 satisfies a first threshold, and if so,
decreasing said length,
6 quantizing said second Doppler frequency into a second
frequency bin having a second bin center, and
8 setting said bin center memory to said second bin center;
and
10 determining whether said first difference is reflective of a decrease that
satisfies a second threshold, and if so,
12 increasing said length,
quantizing said second Doppler frequency into a third
14 frequency bin having a third bin center, and
setting said bin center memory to said third bin center.

24. The method of claim 23, further comprising:

- 2 receiving a third Doppler frequency that is reflective of a rate of change of
said wireless communications channel at a third time subsequent to said
4 second time;
determining a second difference between said bin center memory and
6 said third Doppler frequency; and
adjusting said length based on said second difference.

25. An equalizer for reducing interference on a wireless communications
2 channel, wherein a Doppler frequency is reflective of a rate of change of the
wireless communications channel, said equalizer comprising:

- 4 a main tap;
a first number of causal taps;
6 a second number of anti-causal taps; and
means for selecting said first and second number based on the Doppler
8 frequency.

26. The equalizer of claim 25, wherein said means for selecting comprises:

- 2 means for initializing said first number and said second number using a
first estimate of the Doppler frequency; and
4 means for adjusting said first number and said second number using a
second estimate of the Doppler frequency subsequent to said first estimate.

27. The equalizer of claim 26, wherein said means for initializing comprises:

- 2 means for quantizing said first estimate into a first frequency bin having a
first bin center; and
4 means for determining said first number and said second number using
said first bin center.

28. The equalizer of claim 27, wherein said means for determining comprises
2 a look-up table.

29. The equalizer of claim 26, wherein a length of the equalizer is reflective
2 of the sum of said first number and said second number, and wherein said
means for adjusting comprises:

4 means for determining whether said second estimate exceeds said first
estimate by an amount satisfying a first threshold, and if so, for decreasing said
6 length; and

8 means for determining whether said second estimate is less than said
first estimate by an amount satisfying a second threshold, and if so, for
increasing said length.

30. The equalizer of claim 29, wherein said means for decreasing comprises
2 means for determining whether said causal taps are more useful than said anti-
causal taps, and if so, for decreasing said second number, and if not, for
4 decreasing said first number.

31. The equalizer of claim 30, wherein said means for increasing comprises
2 means for determining whether said causal taps are more useful than said anti-
causal taps, and if so, for increasing said first number, and if not, for increasing
4 said second number.

32. The equalizer of claim 29, wherein said means for decreasing comprises
2 means for determining whether an elapsed time since said length was last
increased satisfies a threshold, and if so, for decreasing said length.

33. The equalizer of claim 32, wherein said means for increasing comprises
- 2 means for determining whether an elapsed time since said length was last decreased satisfies a threshold, and if so, for increasing said length.